Space Weather Forecast

Issued on Sunday, 12 March 2023 at 12:30 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight Chance of isolated Moderate class flares (R1-R2/Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with only occasional low level Common-class flares. There are currently eleven sunspot regions on the visible disc, with the majority small, magnetically simple, and either stable or slowly evolving. The largest region is a moderate size bi-polar group located in the southwest quadrant, and mostly consisting of a relatively large lead spot, with its small trailer spots continuing to show decay.

A filament eruption was observed lifting off the southwest quadrant at 11/1630 UTC, which produced a CME (coronal mass ejection). This has been modelled as off the Sun-Earth line, so no impacts are expected. A further prominence eruption from the northeast limb was observed beginning around 12/0300UTC with an associated CME. This has also been modelled and is directed well behind the Earth orbit, so again no impacts are expected.

Solar Wind / Geomagnetic Activity: The solar wind speed gradually declined from slightly elevated to background levels. Total magnetic field strength was predominantly weak but with a slight moderate period between 12/0600-0900UTC. The important north-south component varied weakly, but with a period of more sustained negative/southward orientation between 12/0600-0900UTC, peaking slightly moderate. Geomagnetic activity was Quiet to Unsettled (Kp 0-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to remain generally Low with occasional C-class flares, and a slight chance of an isolated Moderate-class flare.

Solar Wind / Geomagnetic Activity: A coronal mass ejection (CME) associated with a filament eruption off the southwest quadrant on the 10th may pass close enough to Earth to give some glancing influence on Day 4 (15th), but this is low confidence. Another filament eruption observed lifting off the southwest quadrant at 11/1630 UTC, and a prominence eruption from the northeast limb beginning around 12/0300UTC both also produced CMEs. However, modelling indicates both CMEs are directed well away from Earth.

Solar winds are now at slow-ambient levels. No further significant enhancements are expected until the next coronal hole fast wind becomes geo-effective. This is likely by day 4 (15 March) with winds increasing to slightly elevated, perhaps elevated levels.

Geomagnetic activity is likely to be mostly Quiet to Unsettled (Kp 0-3) throughout the period, with a chance of Active intervals by Day 4 (15th), either from any glancing CME effects, or the next

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coronal hole fast wind.

Energetic Particles / Solar Radiation: Solar radiation levels are most likely to stay at background levels, with just a small chance of reaching the S1/Minor Storm threshold or greater should any larger flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	5	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	20	20	20
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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